REMARKS

By this amendment, claims 1-8 and 13-20 have been revised to place this application in condition for allowance. Currently, claims 1-8 and 13-20 are before the Examiner for consideration on their merits.

In review, all pending claims have been revised to increase the lower limit of Ni from 0.1 to 1.0%, and remove "the" preceding "prior austenite" to address the indefiniteness raised by the Examiner. No new matter is raised by the change of the nickel content since this preferred amount is found in paragraph [0048] of the published application. The change to the claims regarding "prior austenite" also removes the rejection based on a lack of antecedent basis.

Turning now to the prior art rejection, claims 1-8 stand rejected under 35 U.S.C. § 103(a) based on United States Patent No. 5,089,067 to Schumacher. Claims 13-20 are also rejected under 35 U.S.C. § 103(a) based on Schumacher alone or when combined with JP 09-041093 to Yamane et al. (Yamane).

Applicants contend that there are errors in the rejection that requires its withdrawal. The errors are addressed below under their respective heading.

It is error for the Examiner to dismiss the limitation regarding the grain boundaries as not further limiting the final product.

In the rejection, the Examiner dismisses the phrase "the amount of carbides in grain boundaries of the prior austenite is not more than 0.5% by volume" as bearing no weight on the patentability determination. The Examiner concludes that this limitation refers to an intermediate feature of the material so that it is not present in the final product and not further limiting in terms of patentability. Moreover, the Examiner purports to have established this conclusion as fact so that Applicants are required to provide rebuttal evidence to overcome this position.

The first error in this approach is that the Examiner provides no factual basis to draw this conclusion. While it is not explained in the rejection, the Examiner is apparently using the fact that the claim says "prior austenite" as

grounds to say that the amount of carbides in grain boundaries as set forth in the claims is a fleeting condition that is not present in the final product. The Examiner provides no basis for the interpretation that the term "prior austenite" must mean a phase that is not present in the final product. While it is true that austenite transforms to martensite, the claim deals with the grain boundaries of prior austenite, not just austenite. The question is whether the grain boundaries of the prior austenite are present or discernible in the final product. Applicants submit that the Examiner has not provided an objective factual basis for contending that the grain boundaries are not present in the final product and this alone taints the rejection and requires its withdrawal or remaking.

The Examiner's interpretation regarding the prior austenite is refuted when considering the teachings of the specification and this is demonstrates clear error on the Examiner's part in drawing the conclusion regarding the grain boundary presence in the final product.

The Examiner's attention is directed to the specification, paragraph [0078] of the published application. In this paragraph, the block thus prepared was heated at 1250 °C for 1 hour and then hot rolled to form a steel plate having a 15 mm thickness. Thereafter, a test material was prepared by applying one of the various heat treatments to the steel plate. The processes employed involved a combination of treatments, AC, AC+LT, AC+HT, WQ, WQ+LT, and WQ+HT, as shown in Tables 2 and 3.

Referring to paragraph [0080], each test material thus prepared was machined to form a corresponding test piece. Tensile tests and the hardness tests were carried our, using these test pieces. Thereafter, tests on the measurement of the amount of carbides in the grain boundaries of the prior austenite, the sulfide stress cracking resistance, the resistance to corrosive wear, and the localized corrosion resistance were carried out under various conditions as described in the specification.

Here, when a steel having an austenite structure at high temperature is quenched and tempered, the structure generally transforms into a martensitic

structure, the austenitic structure and grain boundaries (prior austenite grain boundaries) are sufficiently discernable and can be observed after heat treatments, so that this kind of examination and observation are widely carried out.

Paragraph [0071] is further substantiation that the grain boundaries of the prior austenite are a feature of the claimed steel. The detailed observations and measurement methods of the amount of carbides in the grain boundaries of the prior austenite is done using a procedure wherein an extracted replica specimen is prepared and 10 fields are selected at random from an area of 15 microns by 35 microns. The specimen thus prepared is examined at a magnification of 2000 with an electron microscope. Then, the amount of carbides is determined as an average value from the area of the respective carbides existing in the form of a spot array by the point counting method. Moreover, the grain boundaries in the prior austenite mean the crystalline grain boundaries in the austenite state, which is a structure before the martensitic transformation.

The Examiner's attention is also directed to the website www.metallography.com/grain.htm. Here, the "grain size of the prior austenite" is recited in ASTM Committee E-4 and Grain Size Measurements section.

From the above, it is clear that the grain boundaries of prior austenite are, in fact, measured in the final product and therefore a feature thereof. Thus, it is error for the Examiner to outright dismiss this limitation when examining the claims for patentability purposes.

Schumacher does not teach the claimed amount of carbides.

Since the limitation regarding the amount of carbides at the grain boundaries of the prior austenite must be considered as a material limitation of the claims, the question now becomes whether Schumacher teaches or suggests this limitation.

The invention, in least in part, is based on the observation that "by controlling the amount of carbides in grain boundaries of the prior austenite to be not more that 0.5 volume %, an excellent resistance to sulfide stress corrosion cracking can be exhibited.", see paragraph [0021]. In addition, by controlling

"carbides in grain boundaries of the prior austenite" that are observed on the final product to be the least as being not more than 0.5 volume %, local corrosion at high temperatures are inhibited, while allowing excellent resistance to sulfide stress corrosion cracking to be exhibited, see paragraph [0068-0070].

Schumacher makes no observation whatsoever regarding the amount of carbides at the grain boundaries of the prior austenite. Therefore, the only way that this feature could be present in Schumacher would be based on inherency. Applicants submit that the Examiner does not have a basis to contend that the limitation in question is inherent based on a similarity in composition alone. As the Examiner knows, to take a position on inherency, the inherent thing must always occur. The specification itself demonstrates that steels having the same composition do not always have the same volume percent of carbides at the grain boundaries of the prior austenite, see Tables 2 and 3. Specifically, alloys F, K, and N all show carbide amounts that are within and outside of the claimed range, meeting the claim limitation being process dependent. Thus, the claimed feature of the amount of carbides does not always occur for a given composition.

Since the Examiner cannot merely rely on a compositional standpoint to allege inherency, the Examiner could argue that Schumacher teaches both a composition and processing that results in the claimed amount of carbides. However, the exemplified steels of Schumacher relate to a cast product, which is used either in the as-cast condition or softened and air cooled, see col. 8, lines 47-59. While Schumacher does suggest that the cast product can be further processed, see col. 8, lines 3-10, there is no suggestion regarding the details of this processing. Therefore, there is no suggestion to support a conclusion that Schumacher teaches both a processing and composition that would result in the claimed amount of carbides.

Lacking a basis for inherency, the Examiner must address this limitation from an obvious standpoint. Put another way, the Examiner must produce a reason to support a conclusion that one of skill in the art would produce the claimed amount of carbides in the steel of Schumacher. Lacking any knowledge regarding

the control of the carbide amount at the prior austenite grain boundary, there can be no legitimate reason for the Examiner to assert that this claim limitation is obvious in light of Schumacher. Any contention that the claim limitation in question is obvious is the blatant use of hindsight and such an approach cannot produce a sustainable rejection. Therefore, the rejection of the claims containing this limitation, i.e., claims 1-8 and 13-20 is improper and must be withdrawn. The failure of Schumacher to address this limitation alone requires withdrawal of the rejection, regardless of whether the Examiner agrees or disagrees with the additional arguments in favor of patentability made below.

The change in nickel content means that Schumacher does not teach an overlapping composition.

Each of the claims defines a nickel content of 1.0-4.5%. This raises the question of whether Schumacher can be said to suggest the composition with this amount of nickel. In Schumacher, the desired content of Ni is specifically taught to be less than 1.0%, see col. 6, lines 56-63, and more preferably even less than 0.5%. Schumacher teaches that other elements are substitutes for Ni, so the high levels of Ni are not needed.

With the changes to the claims on this issue, the question is whether Schumacher teaches the alloy of claim 1 in terms of the Ni content. Applicants submit that Schumacher does not teach an overlap that permits the Examiner to assert that a *prima facie* case of obviousness is present with respect to the Ni amount. In addition, since Schumacher teaches that amounts of Ni are not required, there is no reason to increase the levels of Ni to those found in the present claims. Lacking the teaching regarding the claimed amount of Ni, Schumacher fails to establish a *prima facie* case of obviousness since the Ni range is not suggested.

It is error to say that 0.95% Mn is the same as 1.0% Mn.

When making the rejection, the Examiner admits that a technical overlap does not occur with respect to the claimed amount of Mn. The claim defines an upper limit of 0.95% and Schumacher teaches a lower limit of 1.0%. The Examiner

cites MPEP 2144.05 to support this contention. Applicants contend that the Examiner has no basis to contend that 0.95% Mn is the same as 1.0% Mn. In the metallurgical arts, very small amounts of an alloying element can alter the properties of a base material. It is submitted that the Examiner cannot take this position without some factual basis to support it and it is error to baldly assert obviousness when the ranges do not overlap and, in this case, are separated by a 5% difference.

It is error to dismiss the formulas.

Two different formulas are present in the claims. The odd-numbered claims recite the equation $0.2\% \leq Mo + Cu/4 \leq 5\%$ with the even numbered claims reciting the formula $0.55\% \leq Mo + Cu/4 \leq 5\%$.

In addressing the formulas found in the claims, the Examiner relies on *In re Cooper* to dismiss the effect of the formula on patentability. This position could be justified if there should exist known examples that satisfy the relevant inequality relationship within the context of the composition as claimed. However, none of the Examples in Schumacher satisfy both the composition ranges and the formulas that relate Cu and Mo.

The reliance on *In re Cooper* 57 USPQ 117 (CCPA 1943) is noted, but this case does not support the rejection. This case stands for the proposition that "if the prior art shows a range, as appellants admit it does in this case, which includes the ranges claimed, in the absence of the production of a different product they are not entitled to a patent." The court also notes that the alloy ranges claimed "fall within the upper ranges of the patent" and are therefore properly rejected. While the decision also notes that the formula itself is not patentable per se, this is based on the current law in 1943, which is obviously not the present day law.

In Schumacher, there is no overlap in Mn or Ni contents. Moreover, each example in Table 1 is different from that claimed, particularly in terms of Mn content, C content, Ni content, or Cr content. Therefore, the Examiner cannot summarily dismiss the formula on the grounds that Schumacher teaches a

composition that overlaps that which is claimed. Because of this, the Examiner must address the formula from the standpoint of obviousness. When doing so, there is no basis from which to conclude that the formula can be derived from the teachings of the prior art. This is because the prior art does not even recognize the importance of the control of Mo and Cu in terms of corrosion resistance as has been discovered by the inventors.

The claimed invention as described in paragraph [0019] is accomplished based on the finding that "in order to insure resistance to sulfide stress corrosion cracking in a corrosive environment containing a very small amount of H_2S, a mixture of copper sulfide and molybdenum sulfide provides a very fine and dense layer, and therefore, provides a protection effect on the chromium oxide film." In contrast, there is neither a recitation nor suggestion in Schumacher about the protection of chromium oxide film in a corrosive environment containing H_2S, let alone limiting the value of Mo+Cu/4 from the viewpoint of protection of chromium oxide film. Therefore, the limitations of alloy composition and Mo+Cu/4 in the claimed invention are not suggested by Schumacher.

The combination of Schumacher and Yamane is improper.

In the rejection, the Examiner relies on Yamane in the alternative to allege that one would expect that the composition of Schumacher would be capable of forming a copper sulfide layer since Yamane teaches that Mo prevents stress corrosion cracking and copper strengthens and assists the Mo film to control hydrogen diffusion into the steel by formation of a copper sulfide layer, citing paragraph [0013] of the translation.

Applicants contend that it is improper to draw a conclusion of obviousness using the teachings of Yamane since Yamane is completely unrelated to the composition of Schumacher.

Referring to paragraphs [0012 and 0013], Yamane teaches that Ni plays an important role in enhancing corrosion resistance in addition to Mo and Cu. Among all, Ni strengthens a protection film to thereby enhance CO_2 corrosion resistance,

CO_2 stress corrosion cracking resistance, pitting corrosion resistance, and sulfide stress corrosion cracking resistance wherein a Ni content in the range of 3.0-5.5% is essential. In Yamane, the effects of enhancing corrosion resistance can be materialized only if the Ni content is in the stated range, i.e., not less than 3%, thus permitting the combined effects of Ni, Cu, and Mo to be obtained.

In Schumacher, Ni is minimized with other elements taking its place. Since Yamane requires more than 3% Ni, and Ni is less than 1% in Schumacher, the Examiner's conclusion that the teachings of Yamane with respect to the effects of Cu and Mo somehow support the conclusion that the levels of Cu and Mo are sufficient to meet the claim requirements regarding formation of the sulfide layers is improper. There is no factual basis using Yamane to support the conclusion regarding the levels of Cu and Mo as recited in claims 13-20.

Moreover, since Yamane teaches the requirement of high levels of Ni, the teachings of Yamane cannot be arbitrarily selected and used to modify Schumacher to somehow arrive at the invention of claims 13-20 and the rejection based on Schumacher and Yamane must be withdrawn.

Schumacher does not teach the amounts of Cu and Mo effective to form the claimed sulfide layer.

The Examiner also takes the position that Schumacher teaches amounts of Cu and Mo so that the claimed sulfide layers would be expected to be present.

First, Schumacher says nothing about the need for Cu and/or Mo for the purpose of the invention. The only way the Examiner can address this limitation is to say that since Schumacher teaches levels of Cu and Mo that overlap the range specified in the claims and the formula so that the claimed effective amounts are present.

It is submitted that the suggestions regarding the levels of Cu and Mo in Schumacher do not lead to the invention in terms of control of Cu and Mo contents to form the sulfide levels for improvements in corrosion resistance. First, Mo is

considered an optional element by Schumacher. This is substantiated by Table 1, wherein none of the alloys use Mo.

Second, Figure 1 of the application demonstrates that a certain level of Cu is required if Mo is not present. This lower limit is not found in Cu since much higher levels of Cu are suggested in Schumacher. Similarly for Figure 2, the levels of Cu when Mo is not present are not contemplated in Schumacher.

Third, Schumacher does not realize that the levels of Cu can be even further reduced by the presence of Mo. The effect of Mo on the amount of Cu is seen in Figures 1 and 2, wherein increasing amounts of Mo permits decreasing amounts of Cu. There is no recognition of the interrelationship between Mo and Cu in terms of corrosion resistance, particularly in terms of the sulfide layer mentioned in the claims, in Schumacher.

For these reasons, Schumacher cannot be said to suggest the amount of Cu and Mo set forth in the claims for purposes of enhancing corrosion resistance.

Schumacher also fails to teach a steel with the claimed properties having a plastically processed history.

Applicants also reiterate the previously-made arguments that the plastically processed history imparts a structural feature to the claims that distinguish it from the cast products of Schumacher. With this limitation, the Examiner can only rely on the vague teachings of Schumacher that the cast material can be further worked if desired. Even with this teaching, it does not lead one of skill in the art to produce a martensitic stainless steel having the claimed carbide amount and hardness property. Schumacher says nothing about the hardness of the cast material once worked so that there is no basis for the Examiner to assert that the claimed levels of hardness are suggested in Schumacher. Similarly, Schumacher says nothing regarding the carbide amounts at the grain boundaries of the prior austenite in the

worked cast steel. Therefore, the presence of the plastically processed history is a further distinguishing feature of the invention that supports the patentability of the claims.

UNEXPECTED RESULTS

Applicants also wish to reiterate the previously-made arguments that the comparative evidence in the specification effectively rebuts any obvious contentions should be Examiner insist that the applied prior art still makes a *prima facie* case of obviousness.

SUMMARY

By this amendment, it is respectfully submitted that claims 1-8 are patentable over Schumacher on the grounds that a *prima facie* case of obviousness has not been established. This is particularly so since the Examiner is obligated to address the limitation regarding carbide amount and there is no inherent basis to assume that this feature is present and no recognition in Schumacher or Yamane to consider it to be obvious.

Claims 13-20 are also not obviated by Schumacher for the same reasons as given above for claims 1-8. In addition, Schumacher or Schumacher and Yamane fail to teach the invention defined in claims 13-30 with respect to the amounts of Cu and Mo for the purpose of sulfide layer formation.

In light of this response, the Examiner is respectfully requested to examine this application in light of this amendment, and pass claims 1-8 and 13-20 onto issuance.

If the Examiner believes that an interview with Applicants' attorney would be helpful in expediting prosecution of this application, the Examiner is respectfully requested to telephone the undersigned at 202-835-1753.

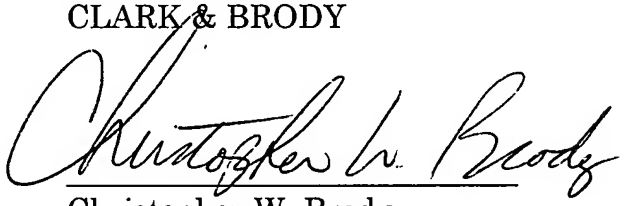
Again, reconsideration and allowance of this application is respectfully requested.

The above constitutes a complete response to all issues raised in the Office Action dated March 5, 2008.

A petition for a one month extension of time is made. A check in the amount of $120.00 is attached.

Please charge any fee deficiency or credit any overpayment to Deposit Account No. 50-1088.

Respectfully submitted,
CLARK & BRODY



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